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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/381,839	09/24/1999	GUNTER DOEMENS	P99.1690	4490
30596	7590	01/12/2005	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C.			LAROSE, COLIN M	
P.O.BOX 8910			ART UNIT	
RESTON, VA 20195			PAPER NUMBER	
			2623	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/381,839

Applicant(s)

DOEMENS ET AL.

Examiner

Colin M. LaRose

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Arguments and Amendments***

1. Applicant's amendments and arguments filed 26 July 2004, have been entered and made of record.

### ***Response to Arguments and Amendments***

2. Applicant has amended claim 4 and has added new claim 7.

With respect to claim 4, Applicant argues that U.S. Patent 4,511,252 by Di Matteo does not "evaluate" the reconstructed 3-D surface, as claimed. See Applicant's Remarks, page 5. U.S. Patent 4,410,609 by Kado et al. is relied upon below to cure this deficiency in Di Matteo.

Also, Applicant asserts that Di Matteo does not disclose evaluating a 2-D image of the object. However, figure 8 of Di Matteo illustrates that Di Matteo does disclose this feature. A 2-D image 60 of the object is evaluated to determine the location of 3-D points P that lie on the surface. Specifically, a series of reference points 58 are superposed on the 2-D image and interpolation between intersecting points helps determine the location of the points P. See column 7, lines 56-68.

### ***Claim Rejections - 35 USC § 103***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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4. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,511,252 by Di Matteo in view of U.S. Patent 5,905,545 by Poradish and U.S. Patent 4,410,609 by Kado et al. ("Kado").

Regarding claim 4, Di Matteo discloses a method for identification (i.e. identification of three depth planes; column 11, lines 56-58) of an object having an object surface, said method comprising:

successively projecting a number of encoded illumination patterns (column 1, lines 61-66, and figure 5) to sequentially illuminate said object surface with at least three colors (figure 5) in a beam path through a variable filter (column 5, lines 28-31) onto said object surface for identification of at least three depth planes of said object in a single image;

registering said image of said object with a color camera from a direction different from said beam path (figure 1a);

determining a 3-D image of a topography of said object surface from said registration in a control and evaluation unit (column 1, lines 28-32, and computer 48, figure 4 that reconstructs the object's surface), the determining including the use of at least triangulation principles (column 11, lines 56-68 and column 15, lines 1-12: the Z coordinate of points on the object is determined by the color masks shown in figures 2-5, whereas the X and Y coordinates are calculated via triangulation principles; see also column 7, lines 56-68 and column 14, lines 57-68 for details of the triangulation); and

evaluating a 2-D image of said object (figure 8: a 2-D image is evaluated to determine the location of points P that lie on the surface; see also column 7, lines 56-68).

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Di Matteo utilizes a standard projection system and thus is silent to sequentially illuminating a digital micro mirror arrangement via a light source of at least three colors and driving the digital micro mirror arrangement to sequentially illuminate the object.

Poradish discloses the operation of a digital micromirror device (DMD) in a projection system (figure 1). The color wheel 20a ("variable color filter") sequentially transmits red, green, and blue light to the light modulator 30a, which comprises a DMD. Then the light is projected through a lens 32a onto the screen. Column 3, lines 26-53.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Di Matteo by Poradish to illuminate a digital micro mirror arrangement via a light source and drive the digital micro mirror arrangement to sequentially illuminate an object, since Poradish discloses that replacing a full-color projection display with a digital micro mirror arrangement that sequentially displays red, green, and blue light is preferred because the DMD reduces the amount of system hardware (column 1, lines 63-66).

Di Matteo is also silent to evaluating the 3-D image once it is constructed.

Kado discloses a method for identifying individuals by facial features. Kado determines the 3-D profile of a face in substantially the same manner as Di Matteo determines the 3-D profile of objects. Kado, like Di Matteo, projects patterns of light onto a face in order to reconstruct the object in three dimensions (see column 6, lines 12-40). Kado discloses that once the 3-D image of a face is acquired, it is further evaluated to make a judgment of whether the face matches pre-stored faces (see column 6, lines 46-61).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Di Matteo and Poradish by Kado to evaluate a 3-D image of the object as claimed, since Kado discloses that evaluating an acquired 3-D image of an object such as a face facilitates identification of the unknown object.

Regarding claim 5, Di Matteo discloses the encoded illumination patterns comprising a stripe pattern having successively varied periodicity (figure 5).

Regarding claim 6, the combination of Di Matteo, Poradish, and Kado discloses the method is used for facial identification (see Kado, column 6, lines 46-61).

Regarding claim 7, Di Matteo discloses a method for identification (i.e. identification of three depth planes; column 11, lines 56-58) of an object having an object surface, said method comprising:

successively projecting a number of encoded illumination patterns (column 1, lines 61-66, and figure 5) to sequentially illuminate said object surface with at least three colors (figure 5) in a beam path through a variable filter (column 5, lines 28-31) onto said object surface for identification of at least three depth planes of said object in a single image;

registering said image of said object with a color camera from a direction different from said beam path (figure 1a);

determining a 3-D image of a topography of said object surface from said registration in a control and evaluation unit (column 1, lines 28-32, and computer 48, figure 4 that reconstructs the object's surface), the determining including the use of at least triangulation principles

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(column 11, lines 56-68 and column 15, lines 1-12: the Z coordinate of points on the object is determined by the color masks shown in figures 2-5, whereas the X and Y coordinates are calculated via triangulation principles; see also column 7, lines 56-68 and column 14, lines 57-68 for details of the triangulation).

Di Matteo utilizes a standard projection system and thus is silent to sequentially illuminating a digital micro mirror arrangement via a light source of at least three colors and driving the digital micro mirror arrangement to sequentially illuminate the object.

Poradish discloses the operation of a digital micromirror device (DMD) in a projection system (figure 1). The color wheel 20a ("variable color filter") sequentially transmits red, green, and blue light to the light modulator 30a, which comprises a DMD. Then the light is projected through a lens 32a onto the screen. Column 3, lines 26-53.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Di Matteo by Poradish to illuminate a digital micro mirror arrangement via a light source and drive the digital micro mirror arrangement to sequentially illuminate an object, since Poradish discloses that replacing a full-color projection display with a digital micro mirror arrangement that sequentially displays red, green, and blue light is preferred because the DMD reduces the amount of system hardware (column 1, lines 63-66).

Di Matteo is also silent to comparing the 3-D image to pre-stored data, as claimed.

Kado discloses a method for identifying individuals by facial features. Kado determines the 3-D profile of a face in substantially the same manner as Di Matteo determines the 3-D

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profile of objects. Kado, like Di Matteo, projects patterns of light onto a face in order to reconstruct the object in three dimensions (see column 6, lines 12-40). Kado discloses that once the 3-D image of a face is acquired, it is further evaluated to make a judgment of whether the face matches pre-stored faces (see column 6, lines 46-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Di Matteo and Poradish by Kado to compare a 3-D image of the object to pre-stored data as claimed, since Kado discloses that comparing an acquired 3-D image of an object such as a face to pre-stored data facilitates identification of the unknown object.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 4,846,577 by Grindon.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37



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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

CML

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6 January 2004

A handwritten signature in black ink, appearing to read 'Vikram Bali', with a large loop at the start and a horizontal line at the end.

**VIKKRAM BALI  
PRIMARY EXAMINER**